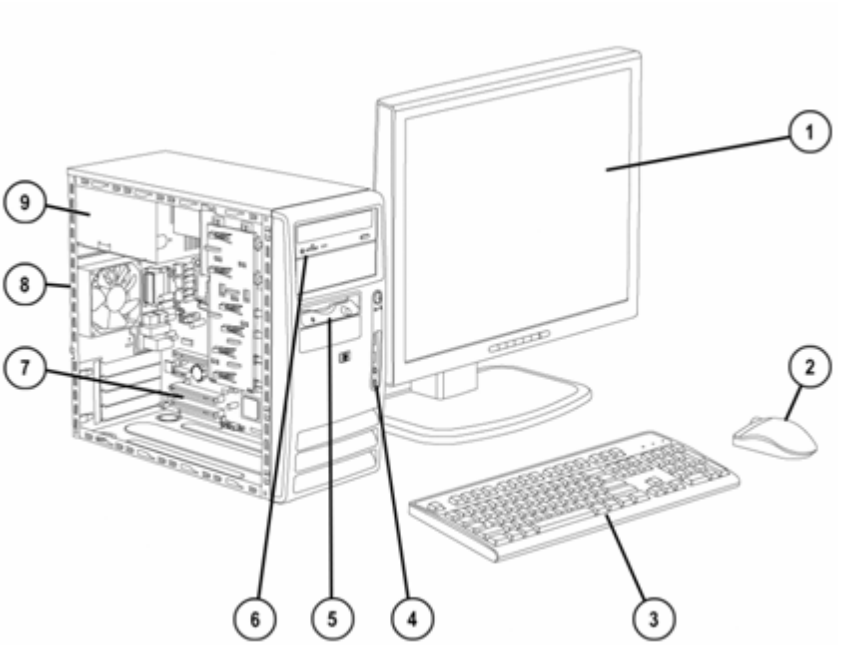
Microtower



1. Monitor (sold separately)
2. 2-Button Scroll Mouse (PS/2) or Optical Scroll Mouse (PS/2 or USB)
3. HP Standard Keyboard (PS/2 or USB) or HP USB Smartcard Keyboard
4. Front I/O: (2) USB 2.0, headphone and microphone
5. (2) 3.5" external bays for optional HP 16-in-1 Media Card Reader, diskette drive, or other 3.5" device
6. (2) 5.25" external bays and (2) 3.5" internal bays
7. (2) full-height PCI slots, (1) full-height PCI Express x1 slot, (1) full-height PCI Express x16 slot
8. Rear I/O: (6) USB 2.0, (1) standard serial port, (1) optional serial port, (1) parallel port, (2) PS/2, (1) RJ-45, (1) VGA, audio in/out, mic in
9. 365-watt Active Power Factor Correction (PFC) power supply

At A Glance

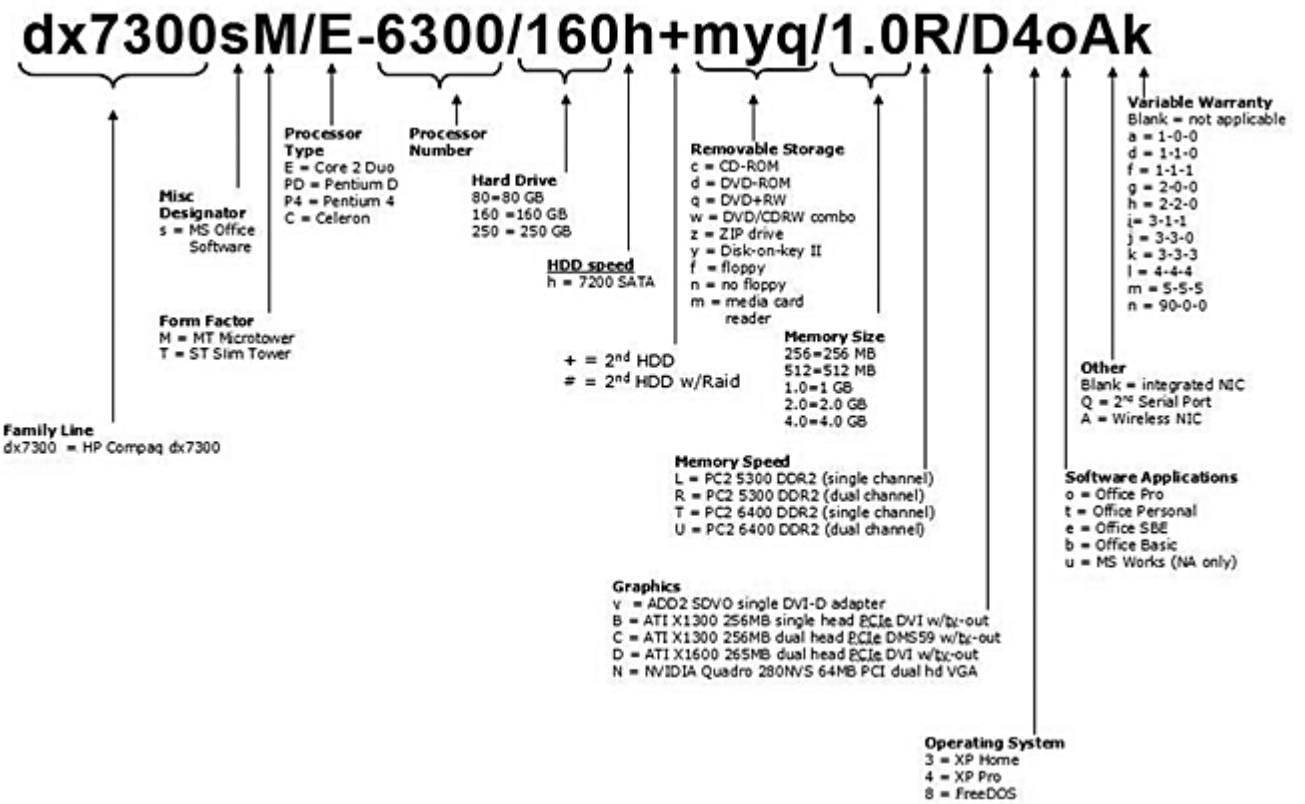
Overview

- Designed for customers desiring the latest Intel technology and maximum upgradeability
- Created using industry leading Design for Environment standards. Upgradeable, recyclable and energy efficient.
- Intel® Q965 Express chipset and Intel Graphics Media Accelerator 3000 integrated graphics
- Intel Core™ 2 Duo Processors, Intel Pentium D Processors, Intel Pentium 4 Processors, Intel Celeron D Processors
- Value-added software
  - HP Client Manager (http://h18000.www1.hp.com/im/index.html)
  - HP OpenView Configuration Management Solutions
  - Altiris Deployment Solution Agent
  - Symantec AntiVirus 10.0 with 60 day Live Update Subscription
  - HP Insight Diagnostics software
- HP BIOS for better security, manageability and software image stability
- Tailored HP Factory Express deployment and lifecycle services available (http://h71028.www7.hp.com/enterprise/cache/97688-0-0-225-121.aspx)
- Protected by HP Services, including standard warranties ranging from 90-0-0 to 3-3-3 (terms and conditions vary by country; certain restrictions and exclusions apply)
- Security
  - Redundant Array of Independent Disks (RAID) 1 configurations to protect data against hardware failures
  - HP Backup and Recovery Manager to protect data against software corruption or incompatibilities due to patching or upgrades
- Tool-less serviceability features for easier upgrades and repairs
- Choice of professional chassis form factors to accommodate the desired mix between expandability and size

NOTE: All models and features may not be available in all countries.

Model Key and Example

NOTE: This diagram is an example that illustrates how to read the model number. It is not intended to give every available configuration choice specified in the body of this document and may include references to modules that are out of date and no longer available.



Configurable Components

Operating System – One of the following

Genuine Windows XP Professional SP2

Genuine Windows XP Home SP2

FreeDOS

Windows Vista Capable – Not all Windows Vista features are available for use on all Windows Vista Capable PCs. All Windows Vista Capable PCs will run the core experiences of Windows Vista, such as innovations in organizing and finding information, security, and reliability. Some features available in premium editions of Windows Vista -- like the new Windows Aero™ user interface -- require advanced or additional hardware.
Check http://www.windowsvista.com/getready for details.

NOTE: Microsoft Windows NT 4.0 and Microsoft Windows 2000 are not available on these systems. Some drivers for Windows 2000 are available for download from http://www.hp.com.

Value-added Software (not included with FreeDOS)

- Altiris Deployment Solution Agent
- HP OpenView Configuration Management Solutions Agent (visit http://www.hp.com/go/easydeploy)
- HP Insight Diagnostics (on documentation CD)
- Computer Setup Utility
- HP Backup and Recovery Manager
- Symantec AntiVirus 10.0 with 60 day Live Update Subscription
- PDF Complete
- Microsoft Office 2003 Basic
- Microsoft Office 2003 Personal
- Microsoft Office 2003 Professional
- Microsoft Office 2003 Small Business
- Microsoft Works 8.5
- Microsoft Internet Explorer with Google Toolbar
- Adobe Acrobat Reader

Value-added Services and Features

- HP Stable Platform Program
- Business-to-Business Portals
- HP Global Series Services
- Factory Express Deployment and Lifecycle Services
- Tool-less Serviceability

Service and Support

On-site Warranty and Service Note 1: This three-year (3-3-3), limited warranty and service offering delivers three years of parts, labor and on-site repair. Response time is next business-day Note 2 and includes free telephone support Note 3 24 x 7. Global coverage Note 2 ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

Configurable Components

	Microtower
Chassis Dimensions (H x W x D)	14.4 x 6.88 x 16.55 in (36.6 x 17.5 x 42 cm)
System weight	24.0 lb (10.89 kg)
System volume	1640 sq. in. (27.0 liters)
Shipping weight	34 lb (15.42 kg)
Shipping box dimensions (H x W x D)	22.25 x 19.63 x 15.13 in (56.52 x 49.86 x 38.43 cm)
Power Supply	365W power supply – Active PFC
Ports	
USB 2.0	8 (2 front, 6 rear)
Serial	1 standard with 2nd optional
Parallel	1
PS/2	1 keyboard, 1 mouse
Video	analog for integrated graphics
DVI output	available via ADD2 card, PCI-E x16 card, or PCI card
Support for Multi-Monitor	available via ADD2 card, PCI-E x16 card, or PCI card
Audio	Front – mic and headphone Rear – line in, line out, mic in
NIC (RJ-45)	Integrated Intel 82566DM Gigabit Network Connection Ethernet

Chipset	Intel Q965 Express chipset

Processor and Speed* One of the following

Intel Celeron D Processors:
Intel Celeron D 352 Processor (3.20-GHz, 512K L2 cache, 533-MHz FSB)
Intel Celeron D 360 Processor (3.46-GHz, 512K L2 cache, 533-MHz FSB)

Intel Pentium 4 Processors with Hyper Threading Technology:
Intel Pentium 4 524 Processor (3.06-GHz, 1-MB L2 cache, 533 -MHz FSB)
Intel Pentium 4 531 Processor (3.0-GHz, 1-MB L2 cache, 800-MHz FSB)
Intel Pentium 4 541 Processor (3.2-GHz, 1-MB L2 cache, 800-MHz FSB)
Intel Pentium 4 661 Processor (3.26-GHz, 2-MB L2 cache, 800-MHz FSB)

Intel Pentium D Processors:
Intel Pentium D 820 Processor (2.8-GHz, 2x1MB L2 cache, 800-MHz FSB)
Intel Pentium D 915 Processor (2.8-GHz, 2x1MB L2 cache, 800-Mhz FSB
Intel Pentium D 925 Processor (3.0-GHz, 2x2MB L2 cache, 800-MHz FSB)
Intel Pentium D 945 Processor (3.4-GHz, 2x2MB L2 cache, 800-MHz FSB)

Intel Core 2 Duo Processors:
Intel Core 2 Duo E6300 Processor (1.86-GHz, 2 MB L2 cache, 1066-MHz FSB)
Intel Core 2 Duo E6400 Processor (2.13-GHz, 2 MB L2 cache, 1066-MHz FSB)
Intel Core 2 Duo E6600 Processor (2.40-GHz, 4 MB L2 cache, 1066-MHz FSB)
Intel Core 2 Duo E6700 Processor (2.66-GHz, 4 MB L2 cache, 1066-MHz FSB)

*NOTE: Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

Memory

DDR2 SYNCH DRAM NON-ECC MEMORY
Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations. The Intel Q965 Express chipsets support non-ECC DDR2 PC2-5300 (667-MHz) and PC2-6400 (800-MHz) memory.

CAUTION: You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

HP recommends dual-channel symmetric configurations for maximum performance.
For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will default to the slowest DIMM.

Microtower

Maximum Memory*

Supports up to 4-GB of DDR2 SYNCH DRAM. *Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.*
NOTE: Above 3-GB, all memory may not be available due to system resource requirements.

DIMM Size	Slot			
	Channel A		Channel B	
	1 (black)	2 (white)	3 (white)	4 (white)
512-MB	512-MB			
512-MB (dual-channel symmetric)	256-MB		256-MB	
1-GB	1-GB			
1-GB (dual-channel symmetric)	512-MB		512-MB	
1-GB (dual-channel symmetric)	256-MB	256-MB	512-MB	
2-GB (dual-channel symmetric)	1-GB		512-MB	512-MB
2-GB (dual-channel symmetric)	512-MB	512-MB	512-MB	512-MB
4-GB maximum (dual-channel symmetric)	1-GB	1-GB	1-GB	1-GB

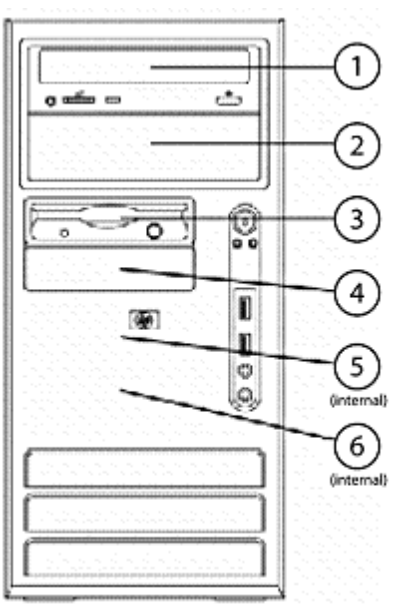
*NOTE: The Intel Q965 Express chipset includes a built-in Management Engine (ME), which allocates memory for manageability functions. Management Engine memory is shared with system memory. If the PC contains a single DIMM, 8 MB of memory is pre-allocated for it at system startup. If the PC contains two DIMMs, 16 MB of memory is pre-allocated. This memory is not made available to the operating system, just as pre-allocated video memory is not available.

Configurable Components

Memory Configurations One of the following	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 512)
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 256)
	1-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 1GB)
	1-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 512)
	2-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 1GB)
	2-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (4 x 512)
	3-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (3 x 1GB)
	4-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (4 x 1GB)

Expandability	**MT**
PCI slots	2 full-height (4.2"), length (13.4") standard
Max power per slot	25W
PCI Express x16 slot	1 full-height (4.2"), length (10.5")
Max power per slot	75W
External Bays	4
3.5"	1
5.25"	3 (2 – length 8.189", 1 – length 5.71")
Internal 3.5" HDD Bays	2
Hard Drive Controller (PCI) Supported	Serial ATA (support for SATA 1.5-Gb/s and 3.0-Gb/s hard drives)
Hard Drive Interfaces Supported	4 Serial ATA interfaces

Microtower



Configurable Components

Storage – Drive Support

	Diskette Drive	MT PCI Media Card Reader (optional)	Storage Drive Bay	3.5" Serial ATA Hard Drives
Quantity Supported	1	1	2	2
Position Supported	③	③, ④	①, ②	③, ④, ⑤, ⑥
Controller	Diskette Controller	USB header on PCI card	SATA	SATA

Hard Drive One or two of the following	80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm) 160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm) 250-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm) RAID 80-GB SATA 3.0-Gb/s Hard Drive (7200 rpm) RAID 160-GB SATA 3.0-Gb/s Hard Drive (7200 rpm) 2nd hard drive, 80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm) 2nd hard drive, 160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm) 2nd hard drive, 250-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm)
Removable Storage – One or more of the following depending on form factor (see Storage section below)	1.44-MB Diskette Drive Optical Drives SATA CD-ROM Drive SATA Combo CD-RW/DVD-ROM Drive SATA DVD-ROM Drive SATA DVD+/-RW (DL/DF) LightScribe Drive
Media Card Reader – One of the following	HP 16-in-1 3.5" Media Card Reader w/ PCI card
Security	Drive Lock Serial, Parallel, USB Enable/Disable (via BIOS) Removable Media Write/Boot Control Power-On Password (via BIOS) Setup Password (via BIOS) Solenoid Hood Lock / Sensor
NIC	Intel 82566DM Gigabit Network Connection (integrated on system board) Intel PRO/1000 PT PCIe Gigabit NIC (full height bracket) Broadcom NetXtreme Gigabit PCIe NIC (full height bracket)

Configurable Components

Modem	Agere 2006 PCI 56K International SoftModem (full height) Agere 2006 PCI 56K International SoftModem (low profile)
Graphics	Integrated Intel Graphics Media Accelerator 3000 DVI ADD2 SDVO single head full-height Graphics Adapter (PCIe x16) ATI RADEON X1300 256MB full-height PCIe Card, DVI w/TV ATI RADEON X1600XT 256MB, full-height PCIe Card, dual DVI w/TV-out NVIDIA Quadro NVS 280 64-MB PCI dual head VGA Card NOTE: *Two NVIDIA Quadro NVS 280 PCI graphics cards can be installed to provide support for four monitors.
Audio	Integrated High Definition audio with Realtek 4-channel ALC262 codec (all ports are stereo) Microphone and Headphone front ports Microphone rear port* Line-out and Line-In rear ports* Multistreaming capable* Internal Speaker *NOTE: *Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in. External speakers must be powered externally. Multistreaming can be enabled in the Realtek control panel to allow independant audio streams to be sent to/from the front and rear jacks. This allows for different audio applications to use separate audio ports on the system. For example, the front jacks could be used with a headset for a communications application while the rear jacks are being used with external speakers and a multimedia application.
Keyboard – One of the following	HP PS/2 Standard Keyboard HP USB BG1650 Keyboard HP USB Standard Keyboard HP USB Smartcard Keyboard
Mouse – One of the following	HP PS/2 2-Button Scroll Mouse HP PS/2 2-Button Optical Scroll Mouse HP USB 2-Button Optical Scroll Mouse
Miscellaneous	HP FireWire / IEEE 1394 PCI Card (full height) 2nd serial port adapter (full height)

After-Market Options (availability may vary by region)

		After-Market Options Part Number
Communications	**Wireless**	
	HP BT450 USB Bluetooth Wireless Printer and PC Adapter	IPQ639A
	NICs	
	Broadcom NetXtreme Gigabit Ethernet PCIe NIC Card	EA833AA
	Intel/PRO 1000 PT PCIe Gigabit NIC Card	EH352AA
	Modem	
	Agere 2006 PCI 56K International Modem	EK694AA
Graphics	**Single head solutions**	
	Intel DVI ADD2 Graphics Adapter (PCIe x16)	DY674A
	ATI Radeon X1300 (256MB SH) PCIe Graphics Card	AG392AA
	Multi head solutions	
	NVIDIA Quadro NVS 280 PCI Graphics Card (DMS59 DVI Dual-head Connector Cable)	DY599A
	NVIDIA Quadro NVS 285 with TurboCache Technology PCIe Graphics Card	EE061AA
	HP DMS59 DVI Dual-head Connector Cable (for NVIDIA Quadro NVS 280 PCI Graphics)	DL139A
Hard Drives	**Serial ATA Hard Drives**	
	HP 80-GB SATA 3.0-Gb/s Hard Drive	PY276AA
	HP 160-GB SATA 3.0-Gb/s Hard Drive	PY277AA
	HP 250-GB SATA 3.0-Gb/s Hard Drive	PY278AA
Input/Output Devices	**Keyboards**	
	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	Pointing Devices	
	HP PS/2 2-Button Scroll Mouse	DD440B
	HP PS/2 2-Button Optical Scroll Mouse	EY703AA
	HP USB 2-Button Optical Scroll Mouse	DC172B
Memory (DIMMs)	**PC2-5300 (DDR2, 667 MHz) DIMMs Non-ECC**	
	HP 1 GB PC2-5300 (DDR2-667) DIMM	PX976AA
	HP 512 MB PC2-5300 (DDR2-667) DIMM	PX975AA
	HP 256 MB PC2-5300 (DDR2-667) DIMM	PX974AA

After-Market Options (availability may vary by region)

Monitors	**TFTs**	
	HP L1506 15 TFT Flat Panel Monitor – Analog only	PX848AA#ABA
	HP L1706 17 TFT Flat Panel Monitor – Analog only	PX849AA#ABA
	HP L1740 17 TFT Flat Panel Display – Analog/Digital	PL766AA#ABA
	HP L1755 17 TFT Flat Panel Display – Analog/Digital	PL777AA#ABA
	HP L1906 19 TFT Flat Panel Display – Analog only	PX850AA#ABA
	HP L1940T 19 TFT Flat Panel Display – Analog/Digital	EM869AA#ABA
	HP L1955 19 TFT Flat Panel Display – Analog/Digital	PD974AA#ABA
	HP L2065 20 TFT Flat Panel Display – Analog/Digital	EF227A4#ABA
	HP LP2465 24 TFT Widescreen Flat Panel Display – Analog/Digital	EF224A4#ABA
	CRTs	
	HP s7540 17 (16.0 vis) CRT Monitor	PF997AA#ABA
	HP v7650 17 (16.0 vis) Flat-face CRT Monitor	PF996AA#ABA
Multimedia	HP USB Powered Speakers	RD628AA
Optical Drives	**DVD-ROM Drive**	
	HP SATA DVD-ROM Drive	AH047AA
	Combo Drive	
	HP SATA CD-RW/DVD-ROM Combo Drive	AH046AA
	DVD+/-RW Drive	
	HP SATA DVD+/-RW (DL/DF) LightScribe Drive	AH048AA
Removable Storage	**Drive Key Options**	
	HP 512MB USB 2.0 Drive Key	ED516AA
	HP 1GB USB 2.0 Drive Key	AG382AA
	Diskette and Digital Drives	
	HP 1.44-MB External USB Diskette Drive	DC141B
	HP 1.44-MB Internal Diskette Drive	DS710G
	Multimedia	
	HP 16-in-1 Media Card Reader with PCI Card	EM718AA
Security	Kensington Lock	PC766A
	HP Business PC Security Lock	PV606AA
	HP USB Biometric Fingerprint Reader	EM717AA
	HP USB Smartcard Keyboard	ED707AA

After-Market Options (availability may vary by region)

Software	HP OpenView Client Configuration Manager	T3488AA (use T3489AA for 1000 licenses)
	HP Client Foundation Suite Includes: HP Client Manager HP Systems Insight Manager Connector Altiris Local Recovery Pro Altiris Inventory Solution Altiris Deployment Solution	EF117AA (use EF118AA for 1000+ licenses)
Miscellaneous Accessories	HP 2nd Serial Port	PA716A
	HP (50 Pk) 5.25" Blank Bezel Kit	DC177B
	HP FireWire / IEEE 1394 PCI Card	PA997A
	Belkin USB to Serial Adapter	EM449AA

Unit Environment and Operating Conditions	
General Unit Operating Guidelines • Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range. • Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow. • Never restrict airflow into the computer by blocking any vents or air intakes. • Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air. • Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow. • If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.	
Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F(-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)
*NOTE: Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.	

Power Supply	Microtower
Power Supply	365 watt custom power supply – Active PFC
Operating Voltage Range	90 – 264 VAC
Rated Voltage Range	100 – 240 VAC
Rated Line Frequency	50/60 Hz
Operating Line Frequency Range	47 – 63 Hz
Rated Input Current	6A
System Heat Dissipation	Typical 375 btu/hr (95 kg-cal/hr) Maximum 1916 btu/hr (483 kg-cal/hr)
Power Supply Fan	92mm variable speed
Energy Star Compliant	YES
Blue Angel Compliant (<5w in S5 – Power Off)	YES
FEMP Standby Power Compliant (<2W in S5 – Power Off)**	YES
Power Consumption in ES Mode – Suspend to RAM (S3) (Instantly Available PC)	< 3W
Environmental and Mechanical Engineering Support Center (EMESC) – Intranet Web Site only	http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm
**NOTE: Power consumption in the Off/Apparent Off mode is measured and reported with the network interface controller "Wake on LAN" feature disabled in F10 Setup (default is "enabled").	

ROM BIOS Information
Key features of the HP BIOS in the dx7300 include: • Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Business desktop computer into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages. • Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification. • Thermal and power management – The HP BIOS provides and enables thermal and power management technologies to assist in operating the HP Business Desktop computer in any enterprise environment. • Serviceability – HP BIOS provides diagnostic and detailed service information. • Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (ROMPAQ, Flashlite), BIOS updates from within Windows (CPQFlash, SSM), HP Client Manager, and fail-safe recovery. Additional HP BIOS Features • Power-On password – Helps prevent an unauthorized user from powering on the system. After a TPM Basic User password is established in windows, the user or admin can require TPM hardware based authentication during the power-on process. • Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS. • Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Compaq dx7300 models use ACPI to provide power conservation features under Windows XP.

Other Features	Description
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
SMBIOS Ver. 2.4	System Management BIOS, previously known as DMI BIOS, for system management information
Wired for Management Support	Intel-driven, industry-wide initiative to make Intel architecture-based PCs, servers and mobile computers more inherently manageable right out of the box and over the network
Dual-State Power Button	Power button acts as both an on/off button and suspend-to-sleep button

Technical Specifications

Serviceability Features of System		
Dual Color Power LED on Front of Computer (Indicates Normal Operations and Fault Conditions)		
Diagnostic LED Explanation Table	Number of 1-second red LED blinks followed by 2-second pause, then repeats: 2-processor thermal protection activated 3-processor not installed 4-power supply failure 5-memory error 6-video error 7-PCA failure (ROM detected failure prior to video) 8-invalid ROM, bootblock recover mode	
• System/Emergency ROM	• Flash ROM	• CMOS Battery Holder for easy Replacement
• Flash Recovery with Video Configuration Record SW	• 5 Aux Power LED on System PCA	• Processor ZIF Socket for easy Upgrade
• Over-Temp Warning on Screen (Requires IM Agents)	• Clear Password Jumper	• DIMM Connectors for easy Upgrade
• HP Backup and Recovery Manager	• Clear CMOS Button	• NIC LEDs (integrated) (Green & Amber)

Serviceability Features of Chassis		
• Dual Color Power and HD LED – To Indicate Normal Operations and Fault Conditions	• Color coordinated cables and connectors	• Tool-less Hood Removal
• Front power switch	• System memory can be upgraded without removing the system board or any internal components	• Tool-less Hard Drive, CD & Diskette Removal
• Green Pull Tabs, and Quick Release Latches for easy Identification		• Tool-less System Board Removal
Feature	Description	
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments	
Drive Lock*	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.	
Drive Self Tests (DPS)*	• Drive Protection System • A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user. • Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced. • The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures	
DPS Access through F10 Setup during Boot		

Technical Specifications

SMART Technology* (Self-Monitoring, Analysis and Reporting Technology)	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted • Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count • By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
SMART I – Drive Failure Prediction	
SMART II – Off-Line Data Collection	
SMART III – Off-Line Read Scanning with Defect Reallocation	
* NOTE: This feature is inoperable when a RAID (Redundant Array of Independent Disks) configuration is enabled.	

High Definition Audio	Type	Integrated
	High Definition Stereo Codec	Yes – Realtek ALC262, 4-channel
	Audio Jacks	Microphone-In (64-K ohm Input Impedance); front and rear stereo analog microphone ports available except for USDT and SFF, which has front stereo microphone only Line-In (64-K ohm Input Impedance) Line-Out * (200 ohms Output Impedance, expects at least a 10-K ohm load) Headphone-Out (1 Ohm Output Impedance, expects at least a 32 ohm load)
	NOTE: *Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally. Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in.	
	Multistreaming Capable	Multistreaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
	Sampling	8 kHz – 192 kHz
	Wavetable Syntheses (software)	Yes – Uses OS soft wavetable
	Analog Audio	Yes
	Number of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)
	Internal Audio Speaker Power Rating	1.5 W
	Internal Speaker	Yes
	External Speaker Jack (Line-Out)	Yes

Integrated Intel 82566DM Gigabit Network Connection	Connector		RJ-45
	Controller		Intel Nineveh Gigabit platform LAN Connect Networking Controller
	Memory		Integrated 96KbB on chip buffer memory
	Data rates supported		10/100/1000 Mbps
	Compliance		IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3 ab and 802.3u compliant,
	Bus architecture		GLCI, LCI interface. Intel specific MAC to PHY interface
	Data transfer mode		At gigabit GLCI (802.3 serdes) is for Data, LCI (parallel bus)for MDIO, at 10/100 LCI for both data and MDIO, GLCI is idle.
	Hardware certifications		FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement		Require 3.3Vaux,1.8V and 1.0V or just 3.3V with integrated regulators Power consumption 1.16 Watts for 82566, whole LOM 2.53 Watts
	ACBS		Intel Auto Connect Battery Saving feature
	Boot ROM support		Yes
	Network transfer mode		Full-duplex
			Half-duplex (not available for the 1000BASE-T transceiver)
	Network transfer rate		10BASE-T (half-duplex) 10 Mbps
			10BASE-T (full-duplex) 20 Mbps
			100BASE-TX (half-duplex) 100 Mbps
			100BASE-TX (full-duplex) 200 Mbps
			1000BASE-T (full-duplex) 2000 Mbps
	Environmental	Operating temperature	32° to 131°F (0° to 55° C) To 70° C for external regulator
		Operating humidity	85% at 131° F (55° C)
	Operating system driver support		Microsoft 2000, Microsoft XP
	Management capabilities		WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic.
	Alerting		ASF 2.0 support

Technical Specifications - Communications

Intel PRO/1000 PT PCIe Gigabit NIC	**Connector**	RJ-45
	Controller	Intel 82572EI Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI-E 1.0a
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM support	Yes
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps
		10BASE-T (full-duplex) 20 Mbps
		100BASE-TX (half-duplex) 100 Mbps
		100BASE-TX (full-duplex) 200 Mbps
		1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)
	Environmental	**Operating temperature** 32° to 131°F (0° to 55° C)
		Operating humidity 85% at 131° F (55° C)
	Dimensions	6.4 x 2.6 x 0.8 in (16.3 x 6.6 x 1.9 cm)
	Operating system driver support	Microsoft 2000, Microsoft XP
	Management capabilities	ASF, WOL, PXE, DMI, WFM 2.0.

Agere 2006 PCI 56K International SoftModem	**Data Transmission**	Technology speeds: 56,000 Kbps maximum downstream data, controllerless
	NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.	
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
	Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
	Power Management	ACPI; PPMI 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
	Upgradeability	Driver upgradeable for future enhancements
	Video	ITU-T V.80 video ready interface
	Other	TIA/EIA 602 standard AT command set
		Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface
		Optional ring wakeup signal

Technical Specifications - Communications

Operating Temperature	32° to 158° F (0° to 70° C)
Operating Humidity	20% to 90%, non-condensing
Operating System Support	Microsoft Windows 2000 and Microsoft Windows XP
OS Driver Support	Microsoft Windows 2000 and Microsoft Windows XP
Power	Requires a 3.3-V auxiliary power rail on PCI bus
	Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
Chipset	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
Dimensions (L X H)	Complies with PCI low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
Connection	Single RJ-11 connector
Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
Safety	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
Health	Bare PCB material compliant to 94V-0 or better (marked as such)
Other	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant

Integrated Graphics Media Accelerator 3000	3D/2D Controller	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.
	VGA Controller	Integrated
	Bus Type	PCI Express™ x16 (If an external graphics card is installed in a PCI slot, the internal graphics can be enabled or disabled using the system's BIOS setup utility. If an external graphics card is installed in the PCI Express™ slot, the internal graphics cannot be enabled).
	RAMDAC	Integrated, 400 MHz
	Memory	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed and system load. 8 MB is pre-allocated for graphics use at system boot time. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use. System memory equal or greater than 512 MB and less than 1024 MB 8 MB pre-allocated + 248 MB DVMT = max frame buffer of 256 MB System memory equal or greater than 1024 MB 8 MB pre-allocated + 376 MB DVMT = max frame buffer of 384 MB
	Controller Clock Speed	400 MHz
	Overlay Planes	Single overlay support with 5x3 filtering
	Maximum Color Depth	32 bits/pixel
	Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 85 Hz at 2048x1536. Varies with mode and configuration. See table below.
	Multi-display Support	Support for one CRT via the motherboard's VGA connector. Support for an additional DVI-D display via the optional DVI ADD2 card. Dual independent displays and dual synchronous (Twin or Clone mode) displays are supported.
	Operating Systems	Microsoft Windows XP and Windows 2000
	Graphics/Video API Support	Microsoft DirectX®9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported[1]

Resolution	Maximum Refresh Rate (Hz)	
	Analog Monitor	Digital Monitor
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 1024	85	60
1600 x 1200	85	60
1920 x 1080	85	60
1920 x 1200	85	60
1920 x 1440	85	60
2048 x 1536	85	60

1 Modes listed are supported with a single active display. The supported mode list for multiple active displays is a subset of this list. Not all modes will support video playback and some supported modes may use software MC (motion compensation) rather than hardware MC. Not all modes will support 3D acceleration depending on the system configuration (e.g., resolution selected, size of frame buffer, number of installed memory modules, etc.).

NOTE: Other resolutions and refresh rates may be selectable but are not recommended.

Technical Specifications - Graphics

DVI ADD2 Graphics

Models	DY674A Intel DVI ADD2 adapter
Form Factor	Low-profile card
DVI-D Connector	Compliant with DDWG (Digital Display Working Group) and VESA specifications for a single-link digital DVI (DVI-D) connector.
Dual Head Support	Yes, when used with the integrated VGA connector
Display Devices Supported	HP L1530 HP L1740 HP L1755 HP L1940 HP L1955 HP L2035 HP L2335

NOTE: The DVI ADD2 card offers optimal performance with any display that meets applicable VESA standards.

Color Depth	All modes support 8-bpp, 16-bpp, and 24-bpp color depths (up to 16.7 million colors)
Host Interface Connector	Mechanically compliant with PCI-E standard Complies with the Intel ADD2 and Intel Serial Digital Video Output (SDVO) specifications
Dot Clock	165 MHz maximum
Display Modes	Supports display modes that require up to 165-MHz bandwidth on the link, as shown in the following table.

Resolution		60-Hz LCD	60-Hz	75-Hz	85-Hz
Blanking		5% reduced	GTF	GTF	GTF
640 x 480	VGA	Yes	Yes	Yes	Yes
800 x 600	SVGA	Yes	Yes	Yes	Yes
1024 x 768	XGA	Yes	Yes	Yes	Yes
1280 x 1024	SXGA	Yes	Yes	No	No
1600 x 1200	UXGA	Yes	Yes	No	No

ATI RADEON X1300 PCIe Graphics Card (256 MB)

Bus Type	PCI Express (x16 lanes)
Maximum Vertical Refresh Rate	85 Hz
Display Support	Integrated 400 MHz RAMDAC
Display Max Resolution	2048 x 1536
Board Display Options	DVI-I + TV DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle) TV connector is a 4-pin mini-DIN S-video connector

Board Configuration 128 MB Frame Buffer

Specification	Description
Graphics Chip	RV515
Core clock	450 MHz
Memory clock	250 MHz
Frame buffer	256 MB DDR2

Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
Operating Systems Support	Windows 2000, Windows XP
Core Power	25 W (Max board power)
Option kit contents	• ATI RADEON X1300 PCIe graphics card with full height bracket attached • Low profile bracket • DVI-to-VGA Adapter • Software CD with graphics drivers • Warranty documentation
Compliance standards	EMC Emissions: a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment c) Canadian Standard ICES-003 is equivalent to CISPR22 d) Taiwanese Standard BSMI e) Japanese VCCI f) Australian C-Tick EMC Immunity: CISPR 24:1997/EN 55024:1998 – Information Technology Equipment - Immunity Characteristics – Limits and Methods of Measurement. Safety: UL 60950 (USA) & EN 60950 (EU): Safety of Information Technology Equipment, Including Electrical Business Equipment. All boards meet UL PCB flammability requirements.

ATI RADEON X1600XT (256 MB DH) FH PCIe Graphics Card

Bus Type	PCI Express (x16 lanes)
Maximum Vertical Refresh Rate	85 Hz
Display Support	Integrated 400 MHz RAMDAC
Display Max Resolution	2560 x 1600 digital, 2048 x 1536 analog
Board Display Options	2 DVI-I ports (one port supports dual link DVI). DVI-I supports an analog CRT or flat panel with a VGA connector via the provided DVI-I to VGA adapter 4-pin mini-DIN S-video connector for TV output

Board Configuration

Specification	Description
Graphics chip	RV530
Core clock	590 MHz
Memory clock	690 MHz
Frame buffer	256 MB GDDR3, 128 bit wide

Operating Systems Support	Windows 2000, Windows XP

	Core Power	56 W (Max board power)

NVIDIA Quadro NVS 280 64MB PCI Dual Head

Form Factor	Low profile (both ATX and low profile brackets included)
Graphic Controller	Integrated Quadro 280 2-D graphics processor unit (GPU)
Bus type	PCI
RAMDAC	Dual 350 MHz integrated
Memory	64 MB DDR with frame buffer and Texture storage
Connector	Single High-density DMS-59 Connector
Dimensions	Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
Controller clock speed	250 MHz
Color depth	32-bits/pixel max
Overlay planes	One 16-bit Video overlay plane
Maximum vertical refresh rate	85 Hz
Multi-monitor support	Dual analog or digital monitors
Dual DVI Support	Yes (with kit DL139A)
High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation
Available graphics drivers	Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode)

NOTE: HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html.

Analog Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	240 Hz
800 x 600	16.7 M	240 Hz
1024 x 768	16.7 M	200 Hz
1600 x 1200	16.7 M	170 Hz
1600 x 1200	16.7 M	150 Hz
1600 x 1200	16.7 M	100 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1440	16.7 M	75 Hz
2048 x 1536	16.7 M	60 Hz

Digital Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	75 Hz
800 x 600	16.7 M	75 Hz
1024 x 768	16.7 M	75 Hz
1152 x 864	16.7 M	60 Hz
1280 x 1024	16.7 M	60 Hz
1600 x 1200	16.7 M	60 Hz (primary only)

7200 rpm Serial ATA Hard Drives	250-GB	Capacity	250,059,350,016 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
			Average	8.5 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	488,397,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	160-GB	Capacity	163,928,604,672 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.9 ms
			Average	9.3 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	320,173,056	
		Operating Temperature	41° to 131° F (5° to 55° C)	

80-GB	Capacity	80,026,361,856 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2.0 ms
		Average	9.3 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	

USB Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	Operating voltage	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		System interface	USB Type A plug connector
		ESD	CE level 4, 15-kV air discharge
		EMI – RFI	Conforms to FCC rules for a Class B computing device
		Microsoft® PC 99 – 2001	Functionally compliant
	Mechanical	Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 – 2001	Mechanically compliant
		Acoustics	43-dBA maximum sound pressure level
	Environmental	Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Operating system support	Windows 2000 and Windows XP	
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
	Kit contents	Keyboard, installation guide, warranty card, safety and comfort guide	

Technical Specifications - Input/Output Devices

PS/2 Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	Operating voltage	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		System interface	PS/2 6-pin mini din connector
		ESD	CE level 4, 15-kV air discharge
		EMI – RFI	Conforms to FCC rules for a Class B computing device
		Microsoft PC 99 – 2001	Functionally compliant
	Mechanical	Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 – 2001	Mechanically compliant
		Acoustics	43-dBA maximum sound pressure level
	Environmental	Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Operating system support	Microsoft Windows 2000 and Windows XP	
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
	Kit contents	Keyboard, keyboard software media, installation guide, warranty card, safety and comfort guide	

HP USB Smartcard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Form factor	USB basic Smart Card keyboard
		Colors	Carbonite/Silver
		Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)
		Weight	2 lb (0.9 kg) minimum

Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	100-mA maximum (with four LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI – RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 – 2001	Functionally compliant
Mechanical	Languages	30+ available
	Keycaps	Low-profile design
	Switch actuation	55 g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
SMARTCARD function	Support	All ISO 7816 smart cards
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)
	Chipset	SCM STCII
	Standard APIs supported	PC/SC, EMV2000, SET
	Power	USB Port Short circuit detection (protects smart card and reader) Power supply compliant with ISO7816 and EMV (5V, 60 mA) Supports 3-V and 5-V cards
	Power consumption	250-mA maximum draw (50 mA for the keyboard with three LEDs ON and 200-mA maximum startup current using a high-current, 60-mA smart card)

		Communication	From card	Programmable from 9,600 baud to 115,200 baud
			From computer	Up to 38,400 baud
		Landing mechanism	Contact device	Friction contact
			Card insertions rating	Up to 100,000 insertion cycles
		Interface modes	USB communications through USB port SCM protocol Automatic card insertion/removal detection	
		Reader performance interface	USB connection	
		Electro-magnetic standards	Europe	89/336/CEE guideline
			USA	USAFCC part 15
USB Standard BG1650 Keyboard (gray)	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)	
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2. 5 cm)	
		Weight	2 lb (0.9 kg) minimum	
	Electrical	Operating voltage	+ 5VDC ± 5%	
		Power consumption	50-mA maximum (with three LEDs ON)	
		System interface	USB Type A plug connector	
		ESD	CE level 4, 15-kV air discharge	
		EMI – RFI	Conforms to FCC rules for a Class B computing device	
		Microsoft PC 99 – 2001	Functionally compliant	
	Mechanical	Languages	38 available	
		Keycaps	Low-profile design	
		Switch actuation	55-g nominal peak force with tactile feedback	
		Switch life	20 million keystrokes (using Hasco modified tester)	
		Switch type	Contamination-resistant switch membrane	
		Key-leveling mechanisms	For all double-wide and greater-length keys	
		Cable length	6 ft (1.8 m)	
		Microsoft PC 99 – 2001	Mechanically compliant	
		Acoustics	43-dBA maximum sound pressure level	

	Environmental	Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Operating system support	Windows 2000 and Windows XP	
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, BG Prufzert Mark	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
	Kit contents	Keyboard, installation guide, warranty card, safety and comfort guide	
HP PS/2 Scroll Mouse	Dimensions	3.8 x 6.3 x 11.6 cm (1.5 x 2.5 x 4.6 in)	
	Weight	4.44 oz (126 g)	
	Environmental	Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
		Non-operating humidity	20% to 80% (non condensing at ambient)
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, 6-drop sequence
		Drop (out of box)	1 m on asphalt tile over concrete, 6-drop sequence
	Electrical	Operating voltage	5 VDC ± 10%
		Power consumption	15 mA
		System consumption	PS/2 mini-din connector
		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		Microsoft PC99 – 2001	Functionally compliant

	Mechanical	Resolution	400 ± 20% DPI
		Tracking speed	10 in/s (25.4 cm/s) maximum
		Acceleration	100 in/s/s (2.54 m/s/s)
		Switch actuation	65 g nominal peak force
		Switch life	1,000,000 operations (using Hasco modified tester)
		Switch type	Low force micro-switches
		Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
		Cable length	6 ft (1.8 m)
		Microsoft PC99 – 2001	Mechanically compliant
	Scroll wheel	Width	8 mm
		Diameter	0.99 in (25.2 mm)
		Maximum rotation speed	30 mm/s
		Switch type	Light force micro-switch
		Switch life	1 million operations
		Mechanical life	Minimum 200,000 revolutions
	Regulatory approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC
	Compatibility	Operating system support	Windows 2000 and Windows XP
HP PS/2 Optical Scroll Mouse	Dimensions (H x L x W)	3.95 x 6.21 x 11.7 cm (1.56 x 2.44 x 4.61 in)	
	Weight	4.44 oz (126 g)	
	Environmental	Operating temperature	-32° to 104°F (0° to 40° C)
		Non-operating temperature	-4° to 140°F (-20° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
		Non-operating humidity	10% to 90% non condensing
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
	Electrical	Operating voltage	5 VDC ± 10%
		Power consumption	100mA
		System consumption	PS/2 mini-din connector
		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		Microsoft PC99 – 2001	Functionally compliant

	Mechanical	Resolution	400 ± 20% DPI
		Tracking speed	10 in/s (25.4 cm/s) maximum
		Acceleration	100 in/s/s (2.54 m/s/s)
		Switch actuation	61 g nominal peak force
		Switch life	3,000,000 operations (using Hasco modified tester)
		Switch type	Low force micro-switches
		Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
		Cable length	6 ft (1.8 m)
		Microsoft PC99 – 2001	Mechanically compliant
	Scroll wheel	Width	8 mm
		Diameter	1.01 in (25.6 mm)
		Maximum rotation speed	48 rats/sec
		Switch type	Light force micro-switch
		Switch life	1 million operations
		Mechanical life	Minimum 200,000 revolutions
	Regulatory approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC
	Compatibility	Operating system support	Windows 2000 and Windows XP
HP USB Optical Scroll Mouse	Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)	
	Weight	0.27 lb (0.12 kg)	
	Cable length	72.8 in (185 cm)	
	System requirements	Microsoft Windows 95, 98, 2000, Me, and XP Available USB port	

Technical Specifications - Optical Storage

SATA DVD+/-RW LightScribe Drive	Height	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	SATA/ATAPI	
	Disc capacity	8.5 GB DL or 4.7 GB standard	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	
	Write speeds	DVD+R	Up to 16X
		DVD+RW	Up to 8X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 4X
		DVD-R	Up to 16X
		DVD-RW	Up to 6X
		CD-R	Up to 48X
		CD-RW	Up to 32X
	Read speeds	DVD-RAM	Up to 16X
		DVD+RW, DVD-RW, DVD+R DL, DVD-R DL	Up to 8X
		DVD-ROM, DVD+R, DVD-R	Up to 16X
		CD-ROM, CD-R	Up to 48X
		CD-RW	Up to 32X
	Access time (typical reads, including settling)	Random	DVD: < 130 ms (typical), CD: < 120 ms (typical)
		Full Stroke	DVD: < 240 ms (seek), CD: < 200 ms (seek)
	Power	Source	SATA DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
			12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
			12 VDC (< 600 mA typical, 1400 mA maximum)
	Environmental conditions (operating – non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	86° F (30° C)
	Operating systems support	Microsoft Windows 2000, Windows XP Professional, Windows XP Home	

SATA DVD-ROM Drive	Height	5.25-inch, half-height, tray-load
	Orientation	Either horizontal or vertical
	Interface type	SATA/ATAPI
	Disc capacity	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)

Technical Specifications - Optical Storage

Weight (max)	2.6 lb (1.2 kg)		
Read speeds	DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 8X	
	DVD-ROM	Up to 16X	
	DVD-RAM	Up to 4X	
	CD-ROM, CD-R	Up to 48X	
	CD-RW	Up to 32X	
Removable Storage – Media Compatibility – DVD-ROM	**Media**	**Read**	**Write**
	CD-ROM	Yes	No
	CD-R	Yes	No
	CD-RW	Yes	No
	DVD-ROM	Yes	No
	DVD-ROM DL	Yes	No
	DVD-RAM	Yes	No
	DVD+R	Yes	No
	DVD+R DL	Yes	No
	DVD+RW	Yes	No
	DVD-R	Yes	No
	DVD-RW	Yes	No
	DVD-R DL	Yes	No
Access times (typical reads, including setting)	**Random**	DVD: < 140 ms (typical), CD: < 125 ms (typical)	
	Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)	
	Cache Buffer	2 MB (minimum)	
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)	
Power	**Source**	SATA DC power receptacle	
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p	
	DC Current	5 VDC – <1000 mA typical, < 1600 mA maximum 12 VDC –< 600 mA typical, < 1400 mA maximum	
Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
Operating systems support	Microsoft Windows 2000, Windows XP Professional, Windows XP Home		

Technical Specifications - Optical Storage

SATA CD-RW/DVD-ROM Combo Drive	Height	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	SATA/ATAPI	
	Disc capacity	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	
	Write speeds	CD-R	Up to 48X
		CD-RW	Up to 32X
	Read speeds	DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 8X
		DVD-ROM	Up to 16X
		CD-ROM, CD-R	Up to 48X
		CD-RW	Up to 32X
	Access time (typical reads, including settling)	Random	DVD: < 140 ms (typical), CD: < 125 ms (typical)
		Full Stroke	DVD: < 250 ms (typical), CD: < 210 ms (typical)
	Power	Source	SATA DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
			12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC (< 1000 mA typical, < 1600 mA maximum)
			12 VDC (< 600 mA typical, < 1400 mA maximum)
	Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	86° F (30° C)
	Operating systems support	Microsoft Windows 2000, Windows XP Professional, Windows XP Home	

Technical Specifications - Optical Storage

CD-ROM Drive	Interface	SATA	
	Data Transfer Rate	Variable (Audio CD) – 1,800 to 3,600 KB/s (24X) Max	Variable (CD-ROM, CD-R)– 2,400 to 7,200 KB/s (48X) Max
	Access Time (ms)	Random: <125 ms	Full-stroke seek: <210 ms
	Data Buffer	2MB	
	Disk Formats Read	CD-ROM Mode 1, CD-ROM XA (Mode 2, Form 1 and 2), CD Digital Audio, CD-EXTRA, CD-I (Mode 2, Form 1 and 2) and CD-I Ready, CD-Text, CD-Bridge, Photo CD (Single and Multi Session), Video CD, CD-R and CD-RW Multi-Session	
	Disk Formats Written	None	
	Disk Capacity (CD)	180 MB, 54 0MB, 650 MB, and 700 MB	
	Block Size	Mode 1–2,048, 2,352 bytes Mode 2–1, 2,048, 2,328, 2,336, 2,340, 2,353 bytes Mode 2–2, 2,328, 2,336, 2,340, 2,352 bytes CD-DA–2,352, 2,368 bytes	
	Diameter	12 cm; 8 cm	
	Thickness	1.2 mm	
	Track Pitch	1.6 μm	
	Audio Output Level	Line-out-0.7 V @ 47 Kohm	
	Startup Time	<7 seconds (typical); < 30 seconds with multi-session	
	Operating Conditions	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
	Dimensions (H x W x D, maximum)	1.7 x 5.9 x 8.0 in (4.3 x 15.0 x 20.3 cm)	
	Weight	2.6 lb (1200 g)	
	Operating Systems Supported	Microsoft Windows 2000, Windows XP Professional, Windows XP Home	

HP 16-in-1 Media Card Reader	USB Interface	USB 2.0 High-speed device	
	Advance protocol support	Supports hardware ECC (Error Correction Code) function • Supports hardware CRC (Cyclic Redundancy Check) function • Supports MS 4-bit parallel transfer mode • Supports MS-PRO 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50-MHz SD 4-bit card (version 1.1) • Support high-speed 52-MHz MMC 8-bit card	
	Supported media type with card adapter	• MicroSD (T-Flash) • Memory Stick Micro	
	Mechanical		
	Environmental	Operational Environmental Extremes	Test Parameters/Conditions – Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours
		Storage Environmental Extremes	Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
	Operating system support	Microsoft Windows 2000 (Service Pack 3 or greater), Windows XP Home, Windows XP Professional	
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T	

Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US Energy Star
- Blue Angel
- US Federal Energy Management Program (FEMP)
- Taiwan Green Mark
- China Energy Conservation Program
- IT ECO declaration
- Korea Eco-label
- EPEAT
- Japan PC Green label*

*NOTE: This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'

Microtower

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- Intel LGA775 processor socket
- 8 USB ports
- 2 empty PCI slots
- 1 empty PCIe x1 slot
- 1 empty PCIe x16 slot
- 2 internal drive bays
- 4 external SATA drive bays
- 4 memory slots
- 1 Serial Port (optional)
- 1 external diskette drive (optional)

Spare parts are available throughout the warranty period and or for up to 5 years after the end of production.

Batteries

This product complies with ISO standards:

- EU Directive 91/ 157/ EEC
- EU Directive 93/ 86/ EEC
- EU Directive 98/ 101/ EEC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight
- Lead greater than 4000ppm by weight.

Battery size: CR2032 (coin cell)
Battery type: Lithium

Technical Specifications - Environmental Data

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% recycled materials (by wt.)
- This product is 90% recyclable when properly disposed of at end of life.

RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. From July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

Material Usage

TThis product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) –- except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Technical Specifications - Environmental Data

Packaging	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: [link to new HP white paper now in progress] Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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